



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2014/2015

END OF YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF MEDICINE AND BACHELOR OF SURGERY

MBChB II – PAPER II (M C Q)

HMP: MEDICAL PHYSIOLOGY

DATE: Tuesday, 21st July 2015

TIME: 2.00 p.m. – 3.30 p.m.

INSTRUCTIONS:

- This paper consists of a stem question followed by 4 alternative responses/ choices.
- Choose the single best response out of the choices given. Each question = 1 mark

1. Which of the following is an example of an unmyelinated neuron?
 - a) Anterior horn cell
 - b) Preganglionic parasympathetic neuron
 - c) Preganglionic sympathetic neuron
 - d) Postganglionic parasympathetic neuron
2. True about nerve impulse is:
 - a) Travels in one direction is synapse
 - b) Travels in one direction along axon
 - c) Travels with the speed of electric current
 - d) If current is increased too slowly, the nerve responds very fast
3. Conduction in which type of nerve fibers is blocked maximally by hypoxia?
 - a) C
 - b) A
 - c) B
 - d) Sympathetic nerve

4. Neuromuscular junction:
- a) Is a junction between the motor nerve and skeletal muscle fiber
 - b) Is a junction between nerve and a muscle
 - c) Nerve membrane is in close approximation with number of muscle membranes
 - d) Is a potential space between a nerve and a muscle
5. Which is caused by Acetylcholine through nicotinic receptors?
- a) Contraction of skeletal muscle
 - b) Decrease of heart rate
 - c) Secretion of saliva
 - d) Contraction of pupils
6. A long distance runner utilizes energy from :
- a) Creatine phosphate
 - b) Muscle glycogen
 - c) Blood glucose
 - d) Free fatty acids
7. After-load causes the cardiac muscle to contract:
- a) Isometrically and tension in the increases gradually
 - b) Isotonically with shortening of muscle as a whole
 - c) Isotonically without shortening of muscle as a whole
 - d) Isometrically only
8. In GIT smooth muscle, the action potential is generated by opening up to:
- a) Sodium channel
 - b) Calcium channel
 - c) Sodium-calcium channel
 - d) Potassium channel
9. Single unit smooth muscle refers to:
- a) Single muscle fiber
 - b) Multiple muscle fibers contracting as a unit
 - c) Each muscle fiber contracting independently of the other
 - d) Single stimulus to its nerve causes repeated firing of action potential

10. Where in the body is erythropoietin produced?
- a) Spleen
 - b) Kidney
 - c) Liver
 - d) Thyroid
11. Erythroblastosisfetalis, also known as hemolytic disease of the newborn, most often occurs in _____ mothers carrying _____ fetuses.
- a) Rh+; Rh-
 - b) Rh-; Rh+
 - c) Type A; type O
 - d) Type B; Type A
12. Choose the correct order for the steps of hemostasis.
- a) blood coagulation, platelet plug formation, blood vessel spasm
 - b) platelet plug formation, blood coagulation, blood vessel spasm
 - c) blood vessel spasm, platelet plug formation, blood coagulation
 - d) blood vessel spasm, blood coagulation, platelet plug formation
13. The greatest percentage of blood volume is found in the :
- a) Heart
 - b) Aorta
 - c) Distributing arteries and arterioles
 - d) capillaries
14. Einthoven's triangle is an equilateral triangle, the sides of which represent:
- a) the 3 standard limb leads.
 - b) the 3 unipolar limb leads.
 - c) combination of both the standard and unipolar leads.
 - d) the heart lies at the top of this triangle
15. Baroreceptors of carotid sinus and aortic arch are sensitive to;
- a) increase in systolic pressure.
 - b) increase in venous pressure.
 - c) increase in pulse pressure.
 - d) increase in ventricular pressure.

16. Which mechanism is most effective in returning the BP back to normal:
- Baroreceptor reflexes
 - Chemoreceptor reflexes
 - Capillary fluid shift mechanism
 - Long-term BP regulatory mechanism
17. Blood brain-barrier is made up of:
- Astrocytes
 - Oligodendrocytes
 - Oligodendroglia
 - Microglia
18. Loss of upto 10% of total blood volume over the period of 20 minutes causes:
- Decreased BP, normal venous pressure (VP)
 - Decreased BP, decreased VP
 - Normal BP, normal VP
 - Normal BP, decreased VP
19. In which of the following diseases would you expect to find an increase in thickness of the respiratory membrane?
- Asthma
 - Pulmonary artery thrombosis
 - Skeletal abnormalities of the chest
 - Pulmonary edema
20. Vital capacity is a measure of:
- Tidal volume
 - Inspiratory reserve volume plus expiratory reserve volume
 - Tidal volume plus inspiratory reserve volume plus expiratory reserve volume
 - Expiratory reserve volume plus reserve volume
21. More resistance in expiration is due to:
- Airflow during expiration
 - Compression of airway
 - Change from linear to turbulent flow
 - Saturation with moisture

22. Ventilation/perfusion ratio is ratio of:
- a) Pulmonary ventilation to pulmonary blood flow
 - b) Minute ventilation to pulmonary capillary pressure
 - c) Alveolar ventilation to pulmonary blood flow
 - d) Expired air volume to intra-pulmonary pressure
23. Diffusion capacity of CO₂ is approx. 20 times than that of O₂ because of:
- a) Higher solubility coefficient
 - b) Low solubility coefficient
 - c) Smaller particle size
 - d) Larger surface area of respiratory membrane available for CO₂
24. Milk ejection reflex is mediated by hormone:
- a) Oxytocin
 - b) Vasopressin
 - c) Prolactin
 - d) Oestrogen
25. Adrenarch is:
- a) Onset of menses
 - b) Cessation of menses
 - c) Onset of increase in adrenal androgen secretion
 - d) Increased secretion of adrenal androgen stimulating hormone
26. Cryptorchidism refers to;
- a) Male hypogonadism
 - b) Removal of testis before puberty
 - c) Removal of testis after puberty
 - d) Undescended testes
27. Peak secretion of oestrogen occurs:
- a) Just before ovulation
 - b) Mid-luteal phase
 - c) At the time of ovulation
 - d) Secreted at the same rate during all phases of menstrual cycle

28. During pregnancy there is increase in pulmonary ventilation because of:
- a) Oestrogen
 - b) Increase in surfactant
 - c) Progesterone
 - d) HCG
29. Vision is most acute when light rays are brought to focus on the:
- a) fovea centralis
 - b) the outermost layer of the retina
 - c) optic disc
 - d) cells in the occipital lobes of the brain
30. Loss of the sense of taste on the posterior 1/3 of the tongue might be due to injury to:
- a) cranial nerve VII
 - b) cranial nerve III
 - c) cranial nerve IX
 - d) cranial nerve V.
31. Which describes the effect of the sympathetic system on the eye pupil and the muscles involved in the action?
- a) dilates / circular muscles
 - b) constricts circular muscles
 - c) dilates / radial muscles
 - d) constricts radial muscles.
32. In a normal 70kg person, intracellular fluid volume is:
- a) 1/4th of total body water
 - b) 1/3 rd of total body water
 - c) 1/2 nd of total body water
 - d) 2/3rd of total body water
33. E.C.F. differs from I.C.F. in man in that:
- a) It forms major portion of total body water
 - b) It has lower tonicity
 - c) Its principal anions are organic
 - d) It has higher $\text{Na}^+ : \text{K}^+$ molar ratio

34. Endoplasmic reticulum is associated with all of the followings except:
- a) Enzymatic secretion
 - b) Lipid secretion
 - c) Glycogen synthesis
 - d) Glycogenolysis
35. Systolic murmurs are common in anaemia, because:
- a) Turbulence occurs more frequently as viscosity of blood is lower
 - b) Turbulence occurs more frequently as diameter of vessel wall is increased
 - c) Anaemia is more frequently associated with aortic stenosis
 - d) Turbulence occurs more frequently as velocity of blood flow increases
36. The portion of the electrocardiogram related to the propagation of the cardiac impulse between the SA node and the AV node is the:
- a) QT interval
 - b) PR interval
 - c) ST interval
 - d) RR interval
37. 1^o heart block differs from 2^o heart block in that, in 1^o heart block:
- a) All the atrial impulses are not conducted to the ventricles
 - b) Atrial: Ventricular rate :: 2:1 or 3:1
 - c) Gradual lengthening of PR interval until one ventricular beat is dropped
 - d) PR interval is abnormally long with atrial:ventricular rate ::1:1
38. Compared with the systemic circulation, the pulmonary circulation is a:
- a) Low-pressure system
 - b) Low-flow system
 - c) High resistance system
 - d) High-volume system
39. Fenestrations are seen in capillaries of:
- a) Brain
 - b) Lungs
 - c) Intestinal villi
 - d) Skeletal muscle

40. Reynold's number is increased by decrease in:
- a) Velocity of flow
 - b) Density of fluid
 - c) Diameter of tube
 - d) Viscosity of fluid
41. As a function of vessel size, the resistance to fluid flow in a vessel is:
- a) Directly proportion to the square of the radius
 - b) Directly proportional to the fourth power of the radius
 - c) Inversely proportional to the fourth power of the radius
 - d) Inversely proportional to the square of the radius
42. Of the filtrate that enters the nephron, about what percent is reabsorbed during urine formation?
- a) 99
 - b) 97
 - c) 65
 - d) 80
43. At which of these locations is the osmolality of the filtrate the highest?
- a) Bowman's Capsule
 - b) Proximal tubule
 - c) Bottom of loop of Henle
 - d) Top of collecting duct
44. Ingestion of alcohol results in
- a) Increased aldosterone secretion
 - b) increased permeability of the proximal tubule to water.
 - c) decreased urine osmolality
 - d) Headache due to increased Na^+ reabsorption
45. The function of the countercurrent multiplier is to
- a) increase the concentration of medulla NaCl
 - b) decrease the concentration of medulla NaCl
 - c) Increase potassium reabsorption
 - d) Decrease potassium reabsorption

46. A mother who sleeps through many kinds of noises but wakes up when her baby cries is an example of:
- a) Arousal value
 - b) Habituation
 - c) Sensitization
 - d) Conditioned Reflex
47. If an experimental animal is conditioned to respond to a visual stimulus with one eye covered, what will happen when the trained eye is covered and the untrained eye is subjected to the same visual stimulus:
- a) The animal fails to respond
 - b) The animal responds promptly
 - c) The animal responds after retraining
 - d) The animal responds lately
48. The reticular activating system is stimulated by all the following, EXCEPT
- a) epinephrine
 - b) serotonin
 - c) acetylcholine
 - d) norepinephrine
49. The hypothalamic nucleus that act as a biological clock of the body is
- a) supraoptic nucleus
 - b) preoptic nucleus
 - c) arcuate nucleus
 - d) suprachiasmatic nucleus
50. β – waves of the EEG :
- a) are observed during relaxed wakeful state
 - b) are faster than α – waves but slower than theta waves
 - c) disappear when the person becomes alert
 - d) are observed during REM sleep

51. SW – sleep is characterized by:
- a) predominance of the slow α – waves in EEG
 - b) occurrence of dreams
 - c) irregularity of heart rate and respiratory rate
 - d) being a deep type of sleep
52. The prefrontal area is concerned with all the following, EXCEPT
- a) adjusting behavior
 - b) motor guidance within the surrounding environment
 - c) planning timing of movements
 - d) recall of memories
53. Lesions of the speech center in frontal lobe results in
- a) paralysis of speech muscles
 - b) inability to select appropriate words for use in speech
 - c) inability to understand spoken language
 - d) failure of coordination of speech muscles
54. Complete transection of the spinal cord at the level of T3 would most likely result in
- a) temporary loss of stretch reflexes below the lesion
 - b) temporary loss of conscious proprioception below the lesion
 - c) permanent loss of voluntary control of movement above the lesion
 - d) permanent loss of consciousness above the lesion
55. In control of posture by the brain stem:
- a) Medullary reticular nuclei system inhibit antigravity muscles
 - b) Pontine reticular nuclei system inhibit antigravity muscles
 - c) Vestibular nuclei system transmit inhibit antigravity muscles
 - d) The red nucleus controls axial and proximal muscles
56. The following is **TRUE** regarding the cerebellum:
- a) Intermediate zone of the cerebellar cortex control muscle contractions in the proximal portions of the upper and lower limbs
 - b) The lateral zone of the cerebellar cortex control muscle contractions in the distal portions of the upper and lower limbs
 - c) The vermis control muscle contractions in the distal portions of the upper and lower limbs
 - d) The lateral zone of the cerebellar cortex works with cerebral cortex in the overall planning of sequential movements

57. Which cells type is PROPERLY matched with its secretion?
- a) Enteroendocrine cell – Trypsinogen
 - b) Chief cell - Intrinsic factor
 - c) G-cell – Pepsinogen
 - d) Enterochromaffin-like cell – Histamine
58. How does the autonomic nervous system affect salivary secretory rate?
- a) Salivary secretory rate is increased in response to parasympathetic and sympathetic stimulation.
 - b) Salivary secretory rate is decreased in response to parasympathetic and sympathetic stimulation.
 - c) Salivary secretory rate is increased in response to parasympathetic stimulation and decreased in response to sympathetic stimulation.
 - d) Salivary secretory rate is decreased in response to parasympathetic stimulation and increased in response to sympathetic stimulation.
59. The _____ secretes peptidases and disaccharidases, whereas the _____ secretes trypsin, chymotrypsin, amylase, lipase, and nucleases.
- a) stomach, liver
 - b) liver, small intestine
 - c) liver, pancreas
 - d) small intestine, pancreas
60. A postganglionic neuron
- a) Has myelinated axons
 - b) Releases neurotransmitter at the effector cell
 - c) Is the first part of an autonomic motor pathway
 - d) Has its cell body in the brain or spinal cord